

REMARKS

This Amendment is responsive to the Office Action dated April 15, 2008. Applicant has amended claims 3-5, 8-12, 15, 16, 18 and 23-28. Applicant has also added claim 29-68. Claims 1-68 are pending upon entry of this Amendment.

Claim Rejection Under 35 U.S.C. § 102

In the Office Action, the Examiner rejected claims 1-3, 12, 23-24 and 26-28 under 35 U.S.C. § 102(b) as being anticipated by Chung et al. (US 6,421,386, hereinafter "Chung"). In the Office Action, the Examiner also rejected claims 1-5, 12-24 and 26-28 under 35 U.S.C. § 102(e) as being anticipated by Zhang et al. (US 7,280,597, hereinafter "Zhang"). Applicant respectfully traverses the rejections to the extent such rejections may be considered applicable to the amended claims. Chung and Zhang fail to disclose each and every feature of the claimed invention, as required by 35 U.S.C. § 102, and provide no teaching that would have suggested the desirability of modification to include such features.

Rejection of claims 1-3, 12, 23-24 and 26-28 in view of Chung

Applicant's independent claim 1 is directed to a method for categorizing a portion of a video frame. Applicant's claim 1 recites using texture information in the portion to determine whether the portion comprises at most a predetermined amount of spatial information. Applicant's claim 1 additionally recites categorizing the portion as nonpredictive if the texture information indicates that the portion comprises at most the predetermined amount of spatial information. Chung fails to disclose each and every feature of the invention as claimed in Applicant's claim 1.

In support of the rejection of claim 1, the Examiner characterized the video encoder shown in FIG. 2 of Chung (referred to herein as "the Chung video encoder") as performing the method of Applicant's claim 1. In particular, the Examiner characterized the Chung video encoder as using "texture information of a current macroblock to determine whether to nonpredictively encode the current macroblock (Intra coding mode of the current macroblock is selected)." Applicant disagrees with the Examiner's characterization of Chung with respect to Applicant's claim 1.

Chung fails to disclose using texture information in the portion of the video frame to determine whether the portion comprises at most a predetermined amount of spatial information and, if the texture information indicates that the portion comprises at most the predetermined amount of spatial information, then categorizing the portion as nonpredictive. Chung, at col. 3, ll. 48-54, describes making a determination of a macroblock coding type (i.e., either intra coding or inter coding). However, to the extent Chung may be viewed as determining whether the macroblock is nonpredictive, Chung fails to disclose how this macroblock coding type determination is made, and certainly does not disclose determining whether the portion of the frame comprises at most a predetermined amount of spatial information and categorizing the portion as nonpredictive when the portion comprises at most the predetermined amount of spatial information, as required by Applicant's claim 1.

With respect to claim 12, Chung fails to teach or suggest using texture information of the current macroblock to determine whether to nonpredictively encode the current macroblock. Additionally, Chung fails to disclose using motion information of the current macroblock to determine whether to predictively encode the current macroblock upon determining not to nonpredictively encode the current macroblock based on the texture information, as further required by Applicant's amended claim 12. As described above with respect to claim 1, Chung fails to disclose how the macroblock coding type determination is made. Therefore, Chung fails to disclose using texture information to determine whether to nonpredictively encode the current macroblock or using motion information of the current macroblock to determine whether to predictively encode the current macroblock, as required by Applicant's claim 12 as amended.

For at least the reasons set forth above with respect to claim 1, Chung also fails to disclose the requirements of Applicant's independent claim 28. Additionally, for the reasons set forth above with respect to claim 12, Chung fails to disclose the requirements of Applicant's independent claims 23 and 26. Therefore, Applicant respectfully requests withdrawal of the rejection of Applicant's claims 1-3, 12, 23-24 and 26-28.

Rejection of claims 1-5, 12-24 and 26-28 in view of Zhang

Applicant's independent claim 1 is directed to a method for categorizing a portion of a video frame. Applicant's claim 1 recites using texture information in the portion to determine

whether the portion comprises at most a predetermined amount of spatial information.

Applicant's claim 1 additionally recites categorizing the portion as nonpredictive if the texture information indicates that the portion comprises at most the predetermined amount of spatial information. Chung fails to disclose each and every feature of the invention as claimed in Applicant's claim 1.

In support of the rejection of Applicant's claim 1, the Examiner characterized variance calculator 320 of FIG. 3 of Zhang as using texture information in the portion of the video frame to determine whether the portion comprises at most a predetermined amount of spatial information. The Examiner also characterized mode decision module 380 as categorizing the portion as nonpredictive if the texture information indicates that the portion comprises at most the predetermined amount of spatial information. Applicant respectfully disagrees with the Examiner's characterization of Zhang with respect to Applicant's claims.

FIG. 3 of Zhang describes techniques for selecting coding modes. As described in col. 5, ll. 45-47 of Zhang, the video encoder of FIG. 3 uses input data to calculate a localized variance of pixel intensity, i.e., texture, with variance calculator 320. The variance is used along with a determined number of bits assigned to the current frame to obtain a multiplier value (λ) 341. The video encoder of FIG. 3 of Zhang also uses the input data to compute a motion vector 311 with motion estimation (ME) module 310. A sum of absolute differences (SAD) 351 is computed based on a residual between a current input frame and a motion compensated prediction. Coding mode selection unit 381 of Zhang selects a coding mode for the macroblock based on the multiplier value 341, motion vector 311 and SAD 351.

Col. 7, line 63 – col. 8, line 15 of Zhang describes how the mode decision is made in more detail. In particular, the coding mode selection unit 381 of Zhang determines a cost associated with each mode and selects the mode that has a minimum cost. The cost is determined using a cost function of the form,

$$\text{Cost} = D + \lambda * R$$

where D is a distortion, R is a rate and λ is the multiplier value 341 computed by module 340. D and R are computed in accordance with the equations below.

$$D = \alpha * Q * SAD$$

$$R = MV + b * SAD / Q,$$

where α and b are constant coefficients, Q is a specified quantization scale, SAD is the SAD value 351 computed by module 350, and MV is motion vector 311 computed by ME 310.

The coding mode decision described in Zhang is different than the method of characterizing a portion of the frame as claimed in Applicant's claim 1. For example, Zhang fails to disclose categorizing the portion as nonpredictive if the texture information indicates that the portion comprises at most the predetermined amount of spatial information, as required by Applicant's claim 1. In other words, Applicant's claim 1 requires that the portion is categorized as nonpredictive when the amount of spatial information of the portion of the frame is less than or equal to the predetermined amount of spatial information (e.g., a threshold amount of spatial information).

On the other hand, Zhang computes a coding cost for each of the modes and selects the mode with the smallest cost. Thus, to the extent Zhang uses the texture information (e.g., the variance), the texture information is only used in generating the multiplier λ used for computing the coding cost for each of the modes. There is no analysis of the texture information (e.g., variance) to determine whether the texture information indicates that the portion has at most the predetermined amount of spatial information. As such, the portion of the video frame is not categorized as nonpredictive when the amount of spatial information of the portion comprises at most the predetermined amount of spatial information, as required by Applicant's claim 1. Instead, Zhang selects a coding mode based on the computed costs of the coding modes.

Zhang also fails to teach or suggest the requirements of Applicant's dependent claim 4, which requires that the predetermined amount of spatial information is an average variance value of at least one other video frame, and further includes comparing the calculated variance value of the portion of the video frame to the average variance value of the at least one other video frame and if the variance value of the portion is less than the average variance value of the at least one other video frame, categorizing the portion as nonpredictive. In support of the rejection of claim

4, the Examiner referenced col. 7, line 15-40 of Zhang. The referenced portion of Zhang describes a technique for estimating the multiplier value λ using the average picture texture variance. Thus, to the extent a variance value is computed, the variance value is not compared to an average variance value of at least one other video frame to determine whether the portion is to be categorized as nonpredictive. Therefore, Zhang fails to disclose the requirements of Applicant's claim 4.

Zhang also fails to teach or suggest the requirements of Applicant's independent claim 12, as amended. Applicant's claim 12 requires using texture information of the current macroblock to determine whether to nonpredictively encode the current macroblock. Additionally, Applicant's amended claim 12 to disclose using motion information of the current macroblock to determine whether to predictively encode the current macroblock upon determining not to nonpredictively encode the current macroblock based on the texture information.

As described above with respect to claim 1, Zhang describes performing coding mode selection by computing a cost associated with each mode and selecting the coding mode that has a minimum cost. In accordance with the equations provided above, Zhang computes the cost of each of the coding modes using a combination of variables, including a multiplier computed using the variance, a specified quantization scale, a SAD value and motion vector. Zhang fails, however, to disclose determining whether to nonpredictively encode the macroblock based on the texture information of the macroblock and, upon determining not to nonpredictively encode the current macroblock, determining whether to predictively encode the macroblock using the motion information of the macroblock. In other words, Zhang fails to disclose making a first determination based on the texture information of the macroblock and then making a second determination based on the motion information of the macroblock.

As yet another example, Zhang fails to disclose the requirements of Applicant's independent claim 18, as amended. Applicant's independent claim 18 includes receiving a configuration signal and configuring at least one variable within a complexity control algorithm in accordance with the configuration signal. Applicant's claim 18, as amended, further requires that the complexity control algorithm categorizes portions of a predictive video frame as nonpredictive portions when texture information of the portions indicates there is less than or

equal to a predetermined amount of spatial information. Claim 18, as amended, also requires that configuring the at least one variable of the complexity control algorithm increases the number of portions in the predictive video frame characterized as nonpredictive portions based upon the texture information. As described above in detail with respect to claim 1, Zhang computes a coding cost for each of the modes and selects the mode with the smallest cost. Zhang fails, however, to disclose complexity control algorithm categorizes portions of a predictive video frame as nonpredictive portions when the texture information of the portions indicates there is less than or equal to a predetermined amount of spatial information (e.g., a threshold amount of spatial information).

For at least the reasons set forth above with respect to claim 1, Zhang also fails to disclose the requirements of Applicant's independent claim 28. Additionally, for the reasons set forth above with respect to claim 12, Zhang fails to disclose the requirements of Applicant's independent claims 23 and 26. Moreover, for at least the reasons set forth above with respect to claim 18, Zhang fails to disclose the requirements of Applicant's claims 24 and 27. Therefore, Applicant respectfully requests withdrawal of the rejection of Applicant's claims 1-5, 12-24 and 26-28.

Claim Rejection Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 1-3, 6-8, 11-12 and 18-28 under 35 U.S.C. § 103(a) as being unpatentable over Sekiguchi et al. (US 6,108,449, hereinafter "Sekiguchi"). In the Office Action, the Examiner also rejected claims 4-5 and 9-10 under 35 U.S.C. § 103(a) as being unpatentable over Sekiguchi in view of Zhang. Applicant respectfully traverses the rejections to the extent such rejections may be considered applicable to the claims as amended. The applied references fail to disclose or suggest the inventions defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

Claims 1-3, 6-8, 11-12 and 18-28

Applicant's independent claim 1 is directed to a method for categorizing a portion of a video frame. Applicant's claim 1 recites using texture information in the portion to determine

whether the portion comprises at most a predetermined amount of spatial information.

Applicant's claim 1 additionally recites categorizing the portion as nonpredictive if the texture information indicates that the portion comprises at most the predetermined amount of spatial information. Chung fails to disclose each and every feature of the invention as claimed in Applicant's claim 1.

In support of the rejection of claim 1, the Examiner characterized the encoding system shown in FIG. 1 of Sekiguchi as performing the method of Applicant's claim 1. In particular, the Examiner characterized the motion detecting units 10, 14 of Sekiguchi as using texture information in the portion to determine whether the portion comprises at most a predetermined amount of spatial information. The Examiner characterized the texture encoding unit 18 as categorizing the portion as nonpredictive if the texture information indicates that the portion comprises at most the predetermined amount of spatial information. Applicant disagrees with the Examiner's characterization of Sekiguchi with respect to Applicant's claim 1.

Col. 17, lines 1-15 of Sekiguchi describes texture encoding unit 18 selecting an intra or inter coding mode. In particular, texture encoding unit 18 selects the intra or inter coding mode to offers the highest degree of encoding efficiency. Sekiguchi fails, however, to disclose the texture encoding unit using the texture information in the portion to determine whether the portion comprises at most a predetermined amount of spatial information and, if the texture information indicates that the portion comprises at most the predetermined amount of spatial information, then categorizing the portion as nonpredictive, as required by Applicant's claim 1. In fact, Sekiguchi fails to disclose how the selection between intra and inter coding mode is made, other than to say that the coding mode with the highest degree of encoding efficiency is selected.

Applicant's independent claim 6 further requires that if the texture information indicates that the portion does not comprise at most a predetermined amount of spatial information, then performing a motion estimation search and using motion information determined during the motion estimation search to determine whether the portion comprises at least a predetermined amount of predictive information. Applicant's claim 6 also requires categorizing the portion as predictive if the motion information indicates that the portion comprises at least the predetermined amount of predictive information and categorizing the portion as nonpredictive if

the motion information indicates that the portion does not comprise at least the predetermined amount of predictive information.

In support of the rejection of these additional features of Applicant's claim 6, the Examiner characterized motion compensation units 12, 17 of Sekiguchi as obviously determining the macroblock is inter (predictive) or intra (nonpredictive). Again, Applicant disagrees with the Examiner's characterization of Sekiguchi. As described above, Sekiguchi, at col. 17, lines 1-15, describes texture encoding unit 18 determining whether the macroblock is intra or inter coded. As such, motion compensation units 12, 17 do not make such a determination as asserted by the Examiner. Moreover, Sekiguchi fails to describe how texture encoding unit 18 selects the intra or inter coding mode other than to say that it selects the mode that offers the highest degree of encoding efficiency. As such, it would not have been obvious to one of ordinary skill in the art that, based on the teachings of Sekiguchi, the texture encoding unit 18 (or motion compensation units 12, 17) categorizes the portion as predictive if the motion information indicates that the portion comprises at least the predetermined amount of predictive information and categorizes the portion as nonpredictive if the motion information indicates that the portion does not comprise at least the predetermined amount of predictive information, as required by Applicant's claim 6.

With respect to claim 12, Sekiguchi fails to teach or suggest using texture information of the current macroblock to determine whether to nonpredictively encode the current macroblock and using motion information of the current macroblock to determine whether to predictively encode the current macroblock. As described above with respect to claim 1, Sekiguchi fails to disclose how this macroblock coding type determination is made. Therefore, Sekiguchi fails to disclose using texture information to determine whether to nonpredictively encode the current macroblock or using motion information of the current macroblock to determine whether to predictively encode the current macroblock, as required by Applicant's claim 12.

With respect to claim 18, Sekiguchi fails to teach or suggest receiving a configuration signal and configuring at least one variable within a complexity control algorithm in accordance with the configuration signal. Sekiguchi also fails to teach or suggest the complexity control algorithm categorizing portions of a predictive video frame as nonpredictive portions when texture information of the portions indicates there is less than or equal to a predetermined amount

of spatial information, as additionally required by claim 18. Sekiguchi further fails to teach or suggest configuring the at least one variable of the complexity control algorithm resulting in an increase the number of portions in the predictive video frame characterized as nonpredictive portions based upon the texture information, as recited by Applicant's claim 18 as amended. As described above in detail with respect to claim 1, Sekiguchi fails to disclose how the macroblock coding type determination is made, and therefore could not possibly contemplate categorizing portions of a predictive video frame as nonpredictive portions when texture information of the portions indicates there is less than or equal to a predetermined amount of spatial information, as required by Applicant's claim 18.

For at least the reasons set forth above with respect to claim 1, Sekiguchi fails to teach or suggest the requirements of Applicant's independent claim 28. For at least the reasons set forth above with respect to claim 6, Sekiguchi fails to teach or suggest the requirements of Applicant's claim 25. Additionally, for the reasons set forth above with respect to claim 12, Sekiguchi fails to teach or suggest the requirements of Applicant's independent claims 23 and 26. Moreover, for at least the reasons set forth above with respect to claim 18, Sekiguchi fails to teach or suggest the requirements of Applicant's claims 24 and 27. Therefore, Applicant respectfully requests withdrawal of the rejection of Applicant's claims 1-3, 6-8, 11-12 and 18-28.

Claims 4-5 and 9-10

In the Office Action, the Examiner rejected claims 4-5 and 9-10 under 35 U.S.C. § 103(a) as being unpatentable over Sekiguchi in view of Zhang. Applicant respectfully traverses the rejection. For at least the reasons described above with respect to claim 1 and 6, neither Sekiguchi nor Zhang alone or in combination teaches or suggests the limitations of Applicant's independent claims 1 and 6. Therefore, the Examiner has failed to establish a prima facie case for non-patentability of Applicant's claims 4-5 and 9-10 under 35 U.S.C. § 103(a). Withdrawal of this rejection is respectfully requested.

New Claim

Applicant has added claims 29-68 to the pending application. The applied references fail to disclose or suggest the inventions defined by Applicant's new claims 29-68, and provide no

July 15, 2008

teaching that would have suggested the desirability of modification to arrive at the claimed inventions. No new matter has been added by the new claims.

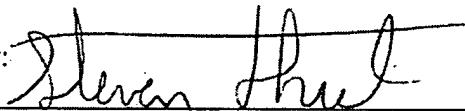
CONCLUSION

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 17-0026. The Examiner is invited to telephone the below-signed attorney to discuss this application.

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